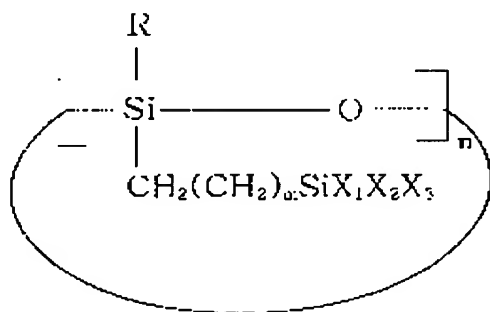


WHAT IS CLAIMED IS:

1. A siloxane-based resin prepared by hydrolyzing and polycondensing monomers (a), (b) and (c) in an organic solvent in the presence of a catalyst and water, wherein
5 monomer (a) is a cyclic siloxane compound of formula (1), monomer (b) is a silane compound of formula (2), and monomer (c) is a silane compound of formula (3):

Formula (1)



[in which,

R is hydrogen atom, C₁₋₃ alkyl group, C₃₋₁₀ cycloalkyl group or C₆₋₁₅ aryl group;

each of X₁, X₂ and X₃, independently, is hydrogen atom, C₁₋₃ alkyl group, C₁₋₁₀ alkoxy group or halogen group, provided that at least one of them is C₁₋₁₀ alkoxy group or halogen group;

m is an integer from 1 to 10; and

n is an integer from 3 to 8];

Formula (2)

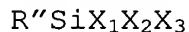


[in which,

5 R' is hydrogen atom, C_{1-3} alkyl group, C_{3-10} cycloalkyl group or C_{6-15} aryl group; and

each of X_1 , X_2 and X_3 , independently, is C_{1-10} alkoxy group or halogen group]; and

10 **Formula (3)**



[in which,

15 R'' is C_{1-3} alkyl or aryl group including fluoro, phenyl or cyano substituent; and

each of X_1 , X_2 and X_3 , independently, is C_{1-10} alkoxy group or halogen group].

2. The siloxane-based resin according to claim 1, wherein
20 the monomer(c) is selected from the group consisting of 3,3,3-trifluoropropyl trimethoxy silane, phenethyl trimethoxy silane and cyanoethyl trimethoxy silane.

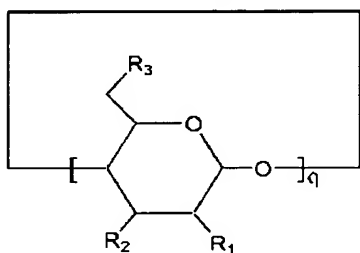
3. A method of forming an insulating film between
25 interconnect layers of a semiconductor device, the method

comprising the steps of: dissolving a siloxane-based resin according to claim 1 in an organic solvent to provide a coating composition; coating a substrate with the coating composition to form a coating film; and curing the coating
5 film by heat.

4. The method according to claim 3, wherein the coating composition further comprises one or more porogen(s).

10 5. The method according to claim 4, wherein the porogen is cyclodextrin of formula (4) or a derivative thereof:

Formula (4)



[in which,

15 q is an integer of 6-12;
each of R₁, R₂ and R₃, independently, is halogen atom, C₀₋₁₀ amino or azido group, C₃₋₂₀ imidazole or pyridine group, C₁₋₁₀ cyano group, C₂₋₁₀ carbonate group, C₁₋₁₀ carbamate group or a functional group represented by -
20 OR₄ (wherein R₄ is hydrogen atom, C₂₋₃₀ acyl group, C₁₋₂₀ alkyl group, C₃₋₁₀ alkene group, C₃₋₂₀ alkyne group, C₇₋₂₀

tosyl group, C₁₋₁₀ mesyl group, C₀₋₁₀ phosphorus group, C₃₋₁₀ cycloalkyl group, C₆₋₃₀ aryl group, C₁₋₂₀ hydroxyalkyl group, carboxy group, C₁₋₂₀ carboxyalkyl group, glucosyl group, maltosyl group or Si compound represented by SiR₁R₂R₃, wherein each of R₁, R₂ and R₃, independently, is C₁₋₅ alkyl, C₁₋₅ alkoxy or C₆₋₂₀ aryl group)].